IN THE CLAIMS

1. – 20. (canceled)

21. **(currently amended)** In a proxy correspondent node provided between a correspondent terminal and a home agent, a method of providing a communication service to a correspondent terminal that communicates with a mobile terminal thereby establishing a communication channel between the correspondent terminal and the mobile terminal on behalf of the correspondent terminal, said method conducted by the proxy correspondent node comprising the steps of:

hunting binding information about the mobile terminal, the binding information being information which provides a correspondence between an IP address of the mobile terminal and an IP address of a foreign agent that is accommodating the mobile terminal and the binding information being transferred from the home agent of the mobile terminal to the correspondent terminal;

processing and storing the binding information for the correspondent terminal; and

processing a data packet from the correspondent terminal to the mobile terminal based on the binding information, wherein the binding information hunting includes the steps of:

determining whether a packet from the home agent is a binding update message,

when the packet is a binding update message, determining whether a cache corresponding to the correspondent terminal has been established,

when the cache has been established, storing the binding update message in a binding cache and a service profile cache, and

when the cache has not been established, generating and transmitting a binding acknowledge message.

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22. (previously presented) The method of claim 21, further comprising the step of:

tunneling the data packet from the correspondent terminal to the mobile terminal based on the binding information.

23. (canceled)

24. (withdrawn from consideration) A proxy correspondent node device which is provided between a correspondent terminal and a home agent, verifies the state of a correspondent terminal when the correspondent terminal is registered with a network and the correspondent terminal may communicate with a mobile terminal in a network composed of a plurality of sub-networks and continues to communicate even when the mobile terminal moves from one sub-network to another sub-network and said proxy correspondent node device conducts a communication service, comprising:

means for setting a visit state flag to an active state when the correspondent terminal is transmitting packets during a registration process;

means for monitoring the flow of packets transmitted from the correspondent terminal;

means for setting the visit state flag to a pending state when the monitoring does not detect a packet flow for a predetermined time period;

means for setting the visit state flag to a left area state when the monitoring does not detect a packet flow for another predetermined time period and the visit state flag is in the pending state;

means for setting the visit state flag to the active state when the monitoring detects a packet flow when the visit state flag is in the pending state and before the another predetermined time period; and

means for deleting a visitor list entry for the correspondent terminal based on a service profile and binding cache information relating to path optimization when the visit state flag is in the left area state.

25. (withdrawn from consideration) A proxy correspondent node device which is provided between a correspondent terminal and a home agent, verifies the state of a correspondent terminal when the correspondent terminal is registered with a network and the correspondent terminal may communicate with a mobile terminal in a network composed of a plurality of sub-networks and continues to communicate even when the mobile terminal moves from one sub-network to another sub-network and which conducts a communication service, comprising:

means for setting a visit state flag to an active state when the correspondent terminal is transmitting packets during a registration process;

means for detecting a packet transmitted from the correspondent terminal;

means for setting a timestamp indicating the time of transmission of the detected packet;

means for monitoring a time difference between the timestamp and a current time;

means for determining the correspondent terminal no longer transmitting packets when the time difference is greater than a predetermined value; and

means for deleting a visitor list entry for the correspondent terminal based on a service profile and binding cache information relating to path optimization when the visit state flag is in the left area state.

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26. – 28. (canceled)

29. (withdrawn from consideration) A proxy communication unit, provided between a correspondent terminal and a home agent, providing and conducting communication services for a correspondent terminal that is communicating with a mobile terminal through a communication network, said proxy communication unit being part of the communication network, said proxy communication unit comprising:

a controller for authenticating the correspondent terminal, verifying and setting the services to be provided to the correspondent terminal and issuing a communication authorization to the correspondent terminal; and

a message handling unit for generating and receiving packets to and from distributed physical nodes to exchange information required in providing the communication services for the correspondent terminal that is communicating with the mobile terminal, including verifying and setting the services to be provided to the correspondent terminal among the distributed physical nodes;

wherein the controller further comprising a cache management unit for storing and managing a binding cache corresponding to the correspondent terminal by detecting binding information transmitted from the home agent to the correspondent node and the binding cache containing information of the mobile terminal, the information providing a correspondence between an IP address of the mobile terminal and an IP address of a foreign agent that is accommodating the mobile terminal.

30. (withdrawn from consideration) The proxy communication unit of claim 29, further comprising:

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a link layer authenticating server for providing authenticating information to said controller; and

a service profile database that stores a service profile of the correspondent terminal.

31. (withdrawn from consideration) The proxy communication unit of claim 30, wherein a service profile of the correspondent terminal comprises an identifier for the correspondent terminal, and a service block that describes the specific services to be provided to the correspondent terminal.

32. (withdrawn from consideration) The proxy communication unit of claim 31, wherein the service block includes a service type, policy information and information specific to the type of service to be provided.

33. (canceled)

34. (withdrawn from consideration) The proxy communication unit of claim 29, wherein the cache management unit further comprises:

a detecting unit for detecting and receiving a binding cache message containing the binding information corresponding to the correspondent terminal and containing information of the mobile terminal;

a generating unit for generating an entry in a cache table if an entry containing the received binding cache information does not exist; and

an updating unit for updating the cache table with the received binding cache information if an entry does exist.

35. (withdrawn from consideration) The proxy communication unit of claim 34, further comprising:

a cache storage unit for storing at least one of the cache table, a visitor list and the service profile.

36. (withdrawn from consideration) The proxy communication unit of claim 29, wherein the controller further comprises:

a tunneling unit for generating a tunnel packet including a care-of-address of the mobile terminal.

37. (withdrawn from consideration) The proxy communication unit of claim 29, wherein the controller further comprises:

a mobile agent unit for dynamically registering and deleting a registration of the correspondent terminal where the correspondent terminal implements a mobile IP protocol as a communication protocol.

38. (withdrawn from consideration) The proxy communication unit of claim 29, wherein the controller further comprises:

a visit state unit for verifying that the correspondent terminal is still in an area where the proxy communication unit provides communication services for the correspondent terminal.

39. (withdrawn from consideration) The proxy communication unit of claim 38, wherein the visit state unit comprises:

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a packet monitoring unit for monitoring packet transmission from the correspondent

terminal, wherein when a packet from the correspondent terminal is not detected for a

predetermined period of time the correspondent terminal is determined to have left the area

where the proxy communication unit provides communication services for the mobile

terminal and the proxy communication unit deletes a registration of the correspondent

terminal.

40. (withdrawn from consideration) The proxy communication unit of claim 38,

wherein the visit state unit comprises:

a packet monitoring unit for monitoring packet transmission from the correspondent

terminal and setting a visit state flag to a pending state when a packet from the correspondent

terminal is not detected for a predetermined period of time; and

a determination timer, started when the visit state flag changes to the pending state,

wherein when the packet monitoring unit does not detect any packets from the correspondent

terminal before the determination timer expires the visit state flag is set to out of area and the

proxy communication unit deletes a registration of the correspondent terminal.

41. (withdrawn from consideration) The proxy communication unit of claim 38,

wherein the visit state unit comprises:

a packet monitoring unit for monitoring packet transmission from the correspondent

terminal and storing a time of transmission of a packet, wherein when a difference between a

present time and the time of transmission is greater than a predetermined period of time the

correspondent terminal is determined to have left the area where the proxy communication

unit provides communication services for the mobile terminal and the proxy communication

unit deletes a registration of the correspondent terminal.

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42. (withdrawn from consideration) A proxy correspondent node device (proxy CN) which is provided between a correspondent terminal and a home agent, forms a communication system with the correspondent terminal, and provides and conducts communication services for a correspondent terminal that is communicating with a mobile node, said proxy CN being part of a communication network, said proxy CN comprising:

a first communication port for communicating with the correspondent terminal;

a second communication port for communicating with the communication network; and

a controller for controlling the transmitting/receiving of messages in the first communication port and the second communication port and for receiving a request message from the correspondent terminal to communicate with the mobile node, authenticating the correspondent terminal, verifying and setting the services to be provided to the correspondent terminal and issuing a communication authorization to the correspondent terminal;

wherein the controller further comprises a cache management unit for storing and managing a binding cache corresponding to the correspondent terminal and containing information of the mobile node, the information providing a correspondence between an IP address of the mobile node and an IP address of a foreign agent that is accommodating the mobile node and the information being transferred from the home agent of the mobile terminal to the correspondent terminal.

43. (withdrawn from consideration) The proxy CN device of claim 42, wherein the controller when authenticating the correspondent terminal accesses a link layer authenticating server for providing authenticating information to said controller; and a service profile database that stores a service profile of the correspondent terminal.

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44. (canceled)

45. (withdrawn from consideration) The proxy CN device of claim 42, wherein the cache management unit further comprises:

a detecting unit for detecting and receiving a binding cache message corresponding to the correspondent terminal and containing information of the mobile node;

a generating unit for generating an entry in a cache table if an entry containing the received binding cache information does not exist; and

an updating unit for updating the cache table with the received binding cache information if an entry does exist.

46. (withdrawn from consideration) The proxy CN device of claim 45, further comprising:

a cache storage unit for storing at least one of the cache table, a visitor list and the service profile.

47. (withdrawn from consideration) The proxy CN device of claim 42, wherein the controller further comprises:

a tunneling unit for generating a tunnel packet including a care-of-address of the mobile node.

48. (withdrawn from consideration) The proxy CN device of claim 47, wherein the tunneling unit encapsulates a packet received from the correspondent terminal and destined for the mobile node within another packet with the care-of-address of the mobile node.

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49. (withdrawn from consideration) The proxy CN device of claim 42, wherein the controller further comprises:

a message handling unit for generating and receiving packets to and from distributed physical nodes to exchange information required in providing the communication services for the correspondent terminal that is communicating with the mobile node, including verifying and setting the services to be provided to the correspondent terminal among the distributed physical nodes.

50. (withdrawn from consideration) The proxy CN device of claim 42, wherein the controller further comprises:

a mobile agent unit for dynamically registering and deleting a registration of the correspondent terminal where the correspondent terminal implements the mobile IP protocol in communicating with the proxy CN device.

51. (withdrawn from consideration) The proxy CN device of claim 42, wherein the controller further comprises:

a visit state unit for verifying that the correspondent terminal is still in an area where the proxy CN device provides communication services for the correspondent terminal.

52. **(currently amended)** A proxy correspondent node device to accommodate a correspondent terminal, said proxy correspondent node device provided between a correspondent terminal and a home agent, makes a communication with a mobile terminal and conducts a communication service thereby establishing a communication channel

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between the correspondent terminal and the mobile terminal on behalf of the correspondent

terminal, comprising:

means for hunting binding information about the mobile terminal, the binding

information providing a correspondence between an IP address of the mobile terminal and an

IP address of a foreign agent that is accommodating the mobile terminal, and the binding

information being transferred from the home agent of the mobile terminal to the

correspondent terminal;

means for processing and storing the binding information for the correspondent

terminal; and

means for processing data packets from the correspondent terminal to the mobile

terminal based on the binding information, wherein the binding information hunting means

includes:

means for determining whether a packet from the home agent is a binding

update message,

means for determining, when the packet is a binding update message, whether

a cache corresponding to the correspondent terminal has been established,

means for, when the cache has been established, storing the binding update

message in a binding cache and a service profile cache, and

means for, when the cache has not been established, generating and

transmitting a binding acknowledge message.

53. (original) The proxy correspondent node device of claim 52, further comprising:

means for transmitting a binding acknowledge message to the home agent, which has

a request to the home agent that subsequent binding information should be transmitted to the

proxy correspondent node device.

54. (canceled)